



NOXIOUS TIMES

A quarterly publication of the California Interagency Noxious Weed Coordinating Committee

In this issue...

Profile: CINWCC
Page 3

Fire and Invasive Plants
Page 4-5

Grazing and
Weed Control
Page 6-7

WMA Update
Page 9

SB 1740: Call for
Weed Research Proposals
Page 9

Ecological Restoration:
Where Are We?
Page 10-13

CDFA Biologist
Profile: Ed Finley
Page 15

Events and Publications
Page 16

Invasive Species: Problems and Solutions in an International Context

BY: JAMIE K. REASER

ASSISTANT DIRECTOR FOR INTERNATIONAL POLICY, SCIENCE, AND COOPERATION
NATIONAL INVASIVE SPECIES COUNCIL

Globalization. The world is crisscrossed with an increasingly expanding network of "pathways." By air, sea, and land, people are moving themselves and their products further and faster than ever before.

A man in Argentina boards a plane for business meetings in South Africa. The stewardess serves him Italian wine. A woman in the United States starts her morning with a cup of Brazilian-roast coffee. The coffee maker is labeled with the words "made in Taiwan." A businessman in South Africa loads shipments of *Proteas* flowers onto planes bound for street markets in the United States and Italy. He is listening to the CD he recently purchased over the Internet, samba music from Brazil. A woman in Taiwan heads to the rice fields at dawn, wearing a hat labeled "made in Argentina."

Cultures and economies are melding together. So too are environments. Invasive species are a consequence of globalization. They are, by definition, an international problem.

continued on page 14...

SAVE THE DATE: Thursday, June 7, 2001 EQIP Education Conference: Statewide Conference To Exchange Conservation Information And Promote Partnerships

California's first education conference of the Environmental Quality Incentives Program (EQIP) is scheduled for Thursday, June 7 from 9:00 a.m. to 4:30 p.m. at the Stanislaus County Agricultural Center in Modesto. Join the USDA Natural Resources Conservation Service, the USDA Farm Service Agency, and the California Association of Resource Conservation Districts (CARCD) and other conservation agencies and organizations in an exchange of conservation partnerships and educational outreach methods.

Designed for conservation and agricultural organizations, the EQIP Education Conference will include a series of panels and facilitated group discussions. EQIP grant recipients and others conservationists will share experiences and recommendations on how to reach your target audience and implement effective conservation programs.

Panel topics approved by an advisory committee of participating organizations include the following: *The Role of Education in Working With Regulators and Landowners; Defining a Great and Measurable Project; Building Community Partnerships: Development, Publicity and Marketing; Reaching Non-Traditional Audiences; Getting an EQIP Grant; and, Granting Your Every Wish, Opportunities For Partnership and Co-Funding.*

continued on page 8...

CINWCC Signatory Agencies and Representatives

California Agricultural Commissioners and Sealers Association

Mark Quisenberry (530) 822-7500

California Department of Food and Agriculture

Nate Dechoretz (916) 654-0768

Steve Schoenig (916) 654-0768

California Department of Transportation

Larry Shields (916) 654-4329

California Resources Agency

Bonnie Turner (916) 445-9992

Department of the Army, U.S. Corps of Engineers, South Pacific Division

Phil Turner (415) 977-8058

U.S. Department of Agriculture, Natural Resources Conservation Service

Dave Dyer (209) 727-5319

U.S. Department of Agriculture, Animal and Plant Health Inspection Service

Dan Hamon (916) 857-6258

Carolyn Pizzo (916) 857-6272

U.S. Department of Agriculture, Forest Service

Cheri Rohrer (415) 705-2545

U.S. Department of Defense, Air Force

Mary Lamb (415) 977-8851

U.S. Department of Interior, Bureau of Indian Affairs

Dale Morris (916) 978-6051

U.S. Department of Interior, Bureau of Land Management

Diana Brink (916) 978 4645

John Willoughby (916) 978-4638

U.S. Department of Interior, Bureau of Reclamation

Jim Scullin (916) 978-5038

U.S. Department of Interior, Fish and Wildlife Service

Pending

U.S. Department of Interior, National Park Service

Curt Deuser (702) 293-8979

Mietek Kolipinski (415) 744-3870

Active Stakeholders

California Association of Nurserymen

Jack Wick (916) 928-3900

California Cattlemen's Association

Ken Zimmerman (562) 866-1400

California Exotic Pest Plant Council

Jake Sigg (415) 731-3028

California Native Plant Society

Jake Sigg (415) 731-3028

The Nature Conservancy

John Randall (530) 754-8890

U.S. Department of Agriculture, Agricultural Research Service

Ray Carruthers (510) 559-5800

Joe Balciunas (510) 559-5975

University of California

Joe DiTomaso (530) 754-8715

Invasive Species Community Looses Great Contributor

The Noxious Times staff is saddened to report that U.S. Fish and Wildlife Service employee and CINWCC representative Scott Stenquist died January 23, 2001. It is our understanding that he died peacefully of natural causes. Scott valiantly struggled with the debilitating effects of diabetes for many years, and that disease may have been a contributing factor to his death.

Scott will be fondly remembered by his friends and colleagues for many things. One was his strong dedication to the work of the Service. Despite his regular frustrations with the pace of bureaucracy, funding limitations, and occasional diabetes-related setbacks, Scott maintained a positive attitude and proactive philosophy. He routinely worked out of his home on evenings and weekends to get the job done. He spent endless hours reviewing literature, participating in professional and interagency meetings, and consulting experts around the world in pursuit of the most efficient and least damaging means to address pest problems. He stubbornly stood his ground, and tenaciously pushed for decisions and commitments to advance the program. He was also the first to reach out to others in need around the office.

Scott's professional career stretched across the National Wildlife Refuge System including Fish Springs, Great Swamp, Tinicum, Upper Mississippi, Umatilla, and

Ankeny National Wildlife Refuges. Most recently, Scott worked as the Pacific Region's Integrated Pest Management Coordinator addressing a variety of critical projects and issues. Of special note was Scott's leadership role in development and implementation of a formal integrated pest management program for the Klamath Basin Refuges in southern Oregon and northern California, a technically complex and politically very controversial issue. Although Scott was regionally based, he regularly operated outside of those boundaries and made significant contributions at the national level, including projects on the control of purple loosestrife, salt cedar, and mosquitoes.

Scott's family decided not to hold a funeral service and suggested that donations in his memory be made to The Nature Conservancy (821 SE 14th Ave., Portland, OR 97214). Remembrances in Scott's name may be targeted at specific lands TNC is attempting to protect, or donations may go to a land preservation endowment. Steve Moore in the US Fish and Wildlife's Regional Office (911 NE 11th Ave., Portland, OR 97223) will forward cards and letters to Scott's family.

Scott's death is a personal and professional loss for many. We will miss him greatly!

These kind words were contributed by colleague, Anne Badgley.

Noxious Times is a publication of the California Interagency Noxious Weed Coordinating Committee. The committee was formed in 1995 when 14 federal, state, and county agencies came together under a Memorandum of Understanding to coordinate the management of noxious weeds. The committee's mission is to facilitate, promote, and coordinate the establishment of an Integrated Pest Management partnership between public and private land managers toward the eradication and control of noxious weeds on federal and state lands and on private lands adjacent to public lands.

The *Noxious Times* newsletter intends to help the committee achieve its goals of coordination and exchange of information by providing land managers throughout the state with information on weed control efforts, news, and successes.

The *Noxious Times* newsletter does not specifically endorse tools, products, or other materials reported here, rather strives to provide baseline data that will lend towards further esmaination and research on the part of the potential user.

Noxious Times is published quarterly by staff of the Integrated Pest Control Branch at the California Department of Food and Agriculture. We welcome submissions for our upcoming issues. Please send to: CA Department of Food and Agriculture, ATTN: Noxious Times, 1220 N Street, Room A-357, Sacramento, CA 95814 or e-mail: noxtimes@cdfa.ca.gov

If you have a colleague whose name you would like to add to our mailing list, please send mailing information to the address above.

Noxious Times Editorial Staff: Carri Benefield, Jennifer Drewitz, Julie Garvin, Galileo Morales, Steve Schoenig, and Rosie Yacoub. Text written by staff unless noted.

PROFILE: California Interagency Noxious Weed Coordinating Committee

Just Who is the California Interagency Noxious Weed Coordinating Committee (CINWCC)?

As awareness about the impacts of invasive weeds escalated during the late 1980s and into the 1990s, a need for California to better coordinate and share information about past, ongoing, and future weed activities (management, eradication, education, mapping, etc.) became evident. Recognizing this need, local, State, and Federal agencies and non-governmental representatives entered a Memorandum of Understanding from 1995-1997. To date, the group includes State and Federal signatory agencies and representatives, as well as many active stakeholder groups (see sidebar on page 2).

Anne Knox with the Bureau of Land Management served as the group's first chairperson from 1995-1997. Nate Dechoretz of the California Department of Food and Agriculture led the group from 1998-1999. Cheri Rohrer of the U.S. Forest Service is the current chair and is finishing up her two year term (2000-2001). CINWCC will soon be looking for new leadership for 2001-2002.

CINWCC's early accomplishments have included:

- Quarterly meetings to share information about ongoing and future weed activities
- War on Weeds Mini-Grants Program initiated and continued
- Development of a CINWCC website (site currently under reconstruction)
- Development of the CalWeed Database, <http://endeavor.des.ucdavis.edu/weeds/>
- Launching of the Noxious Times Newsletter (this issue marks three years in production)

Where is CINWCC headed?

Beyond meeting to share and discuss agency weed activities, a vital role of CINWCC, the group has decided to take on several topics at quarterly meetings throughout 2001. Topic discussions began at the spring 2001 quarterly meeting. On April 12th, CINWCC tackled the recently signed National Invasive Species Management Plan in a morning session. The California Department of Food and Agriculture brought Lori Williams, NIS Executive Director out from Washington D.C. to address the group. This meeting served as an opportunity for CINWCC to discuss the plan and explore what it means for California, and the west as a whole. In the afternoon, the group continued the NIS discussion and heard Agency reports. A copy of the National Invasive Species Management Plan can be found at www.invasivespecies.gov.

CINWCC to take on the following topics:

- **National Invasive Species Management Plan** (topic at spring meeting)
- **Outreach and Support** CINWCC will aim to lend support to Weed Management Area groups in terms of linking groups to funding opportunities and resource for education and awareness activities. CINWCC will resurrect and maintain a website, as well as continue producing the quarterly newsletter, Noxious Times.
- **Research** CINWCC will further identify and reassess research needs and priorities and then distribute findings.
- **Weed Free Forage/ Regulatory** CINWCC will continue to support Weed Free Forage activities and explore other regulatory issues, such as NEPA/CEQA streamlining. CINWCC may also lend support to a new CA policy group. ❖

Update: Federal Weed Bill Continues to Move Through Senate

Mentioned in the previous issue of the Noxious Times (Vol. 3, No. 3), Senator Craig and Senator Daschle, introduced the Harmful Nonnative Weed Funding Act of 2000 (SB 3222) on October 19th, 2000. It was reintroduced in a revised form on January 29, 2001 as S. 198. Highlights from the revised bill are included in the remainder of this article.

S. 198's official stated purpose is "To require the Secretary of the Interior to establish a program to provide assistance through the states to eligible weed management entities to control or eradicate harmful, nonnative weeds on public and private land." The financial assistance will be made available to support both existing weed management entities and encourage the formation of new ones. The Secretary will establish an advisory committee to make recommendations regarding the annual (fiscal year) allocation of funds. However, the final determination shall be made by the Secretary based on seriousness of the weed problem, the extent to which the federal funds will be used, the progress that a state has made in addressing weed problems, and other criteria.

Restrictions on the funding:

- the state must allocate at least 75% of the funding to weed management entities
- the federal share of the cost of carrying out a project cannot exceed 50%

continued on page 8...

Fire and Invasive Plants in

BY: MATT BROOKS, RESEARCH BOTANIST

U.S. GEOLOGICAL SURVEY, WESTERN ECOLOGICAL RESEARCH CENTER

The appropriate and effective management of fire and invasive plants have become important issues for land managers during recent decades in California and the rest of the United States. Reintroduction of fire for ecosystem benefits and recent fuel loads are now relatively commonplace in mesic grasslands, shrublands, and woodlands. Control of invasive plants involves cooperative efforts among public and private land managers at national and local scales. However, for all of the effort expended individually on these two worthy endeavors, very rarely have the interrelationships between fire and invasive plants been considered. In this article I summarize some of the key points.

Interrelationships between fire and invasive plants

Fire can promote the dominance of a wide variety of invasive plants in many different wildland habitats. Invasive plants that respond positively to fire include perennial grasses such as giant reed, fountain grass, and perennial rye; annual grasses such as red brome, cheatgrass, medusahead, and Mediterranean split grass; forbs such as mustards and thistles; succulents such as highway iceplant; and woody plants such as tamarisk, brooms, and gorse. Examples of habitats affected include desert shrublands and shrub-steppe, coastal and interior chaparral and coastal sage scrub, and mixed coniferous forests.

Although fire may not be necessary for invasive plants to become established, it is often an important factor allowing them to become dominant ecosystem components. Increased availability of light and soil nutrients in the postfire landscape seem to favor ruderal species, which can rapidly disperse into burned areas and efficiently convert resources into standing biomass and new propagules. Dense swards of invasive plants can hinder the postfire recovery of native species by competing with them for limiting resources. Some native plant communities can eventually regain dominance, and in the case of mature chaparral suppress germination and growth of invasive annual plants by shading the soil. Unfortunately, invasive annual plants such as mustards can remain dormant in the seedbank for decades, waiting for the next fire or other disturbance event to open up the shrub canopy and allow them to grow and reproduce.

Invasive plants can change fire regimes in ways that promote their own dominance, and in the process type-convert native plant communities into invasive alien communities. Densely packed invasive grasses are notorious for increasing landscape flammability, which promotes fire return intervals that are often much shorter than native plants can survive. The ability of native plants to recover diminishes with invasive grasses that are fueling the fire. This grass-fire cycle has converted native annual grasslands that were once dominated by perennial grasses into invasive annual grasslands that dominate the landscape. Vegetation type-conversions caused dramatic effects on organisms from invertebrates to macro-vertebrates. By changing the vegetation, the organisms that can live there should change as well. Sometimes the effects are indirect, through trophic levels. One example is the conversion of native annual grassland to invasive annual grassland, which reduced numbers of black-tailed deer and was associated with reduced numbers of golden eagle densities. Very few examples of this sort have been described, but it seems highly probable that altered fire regimes have complex effects on a wide variety of organisms.



Photo by: Matt Brooks

each successive fire, whereas the fires keep coming back for more. native plant communities may appear to persist indefinitely. by altered fire regimes may have ranging from soil flora and fauna to habitat characteristics provided by live there should change as well. as they cascade up through multiple conversion of Great Basin sagebrush reduced available habitat leading to jackrabbits, and reduced the prey declines in golden eagle densities. been described, but it seems highly cause by invasive plants have many

Fire Management Activities and Plant Invasions

Fire management activities can facilitate plant invasions, which may inadvertently cause future fire management problems. Prefire suppression, active fire suppression, and postfire rehabilitation can all promote invasions in various ways. Although these

the Wildands of California

activities are necessary and integral parts of fire management programs, there are some ways their negative effects can be minimized.

Fire breaks create gaps in otherwise continuous native shrub cover can allow invasive plants to spread from local areas of infestation into new areas. The invasion potential along fire breaks is compounded by the arrival of invasive plant propagules on equipment used to construct the breaks and vehicles that subsequently use the breaks as routes of travel. Invasive plant spread along fire breaks can be minimized by not constructing them through known concentrations of invasive plants and by washing vehicle tires before they leave these areas.

Emergency watershed rehabilitation activities after fires can also promote the dispersal of invasive species into postfire landscapes. Steep slopes are often stabilized using mulch or seeding, both of which may contain invasive plant propagules. The potential for introducing undesirable invasive plants can be minimized by using certified weed-free hay as mulch and seeds of native plants or short-lived alien plants such as cereal grains that have a low potential for becoming invasive. Postfire rehabilitation sites should be monitored annually to detect and eradicate nascent populations of invasive plants.

Control of Invasive Plants Using Fire

Ironically, fire may be one of the most useful tools available for controlling invasive plants. Weed flaming has been used in croplands, and involves killing invasive plants with ignited liquid fuels ejected from sprayers. Prescribed fire is more commonly used in wildland areas, and uses the litter or standing dead plants as fuel. As with most invasive plant control methods, single applications are insufficient, and follow-up treatments with additional burning or herbicide applications are necessary.

Not all invasive plant can be controlled using fire. Those most susceptible have perennating structures that are exposed

and vulnerable to fire during some phase of their development. Populations of invasive annual plants can be reduced if fire is

applied while seeds are suspended above-ground in their inflorescences. Fire temperatures are much higher above than at or below the soil surface. Immature seeds have lower lethal temperatures than fully cured seeds due to their higher moisture content. Annual plants with short-lived seed banks are most amenable to management with fire, because successive treatments over only a few years can deplete most of the population.

Revegetation using native plants, or less invasive alien species, is generally required as a final step in any invasive plant control program. Using plants of low flammability can have the added benefit of increasing the interval between fires which may be the single best way to manage fire prone invasive species.

An Integrated Approach Is Needed

Clearly there are many reasons why the management of fire and invasive plants must be integrated, and I have only briefly touched upon them in this article. Managers are partly limited by a lack of basic research on the interrelationships between fire and invasive plants, and programs such as the Joint Fire Sciences Program (www.nifc.gov/joint_fire_sci) are providing important resources to help fill this void. However, plans for managing fire and invasives are still mostly developed separately in most land management agencies, resulting in sometimes conflicting goals. Integration must begin at the planning stages and end with coordinated implementation in the field for effective management of fire and invasive plants. ❖

This article was contributed by: Matt Brooks, Research Botanist, U.S. Geological Survey, Western Ecological Research Center, Las Vegas Field Station, 6770 South Paradise Rd Las Vegas NV, 89119-3721, matt_brooks@usgs.gov



Photo by: Matt Brooks

After fire, a solid non-native grassland

TOOLBOX: Grazing

BY: ROSIE YACOB

We know that grazing can alter vegetation—so why not manipulate the interaction to control weedy vegetation? There are a growing number of people who are lending their expertise with animals to efforts in weed control. For example, Michelle and Denny McCoy combine selling mohair and vegetation management into a business that involves 200-300 Angora goats. Denny goes out to a site to assess the terrain and talk to the land owner or manager about their goals. Sometimes the goal is to eliminate a blackberry bramble, or reduce fire fuels. Other times the goal is reducing noxious weeds like yellow starthistle. The McCoy's set up portable electric fencing to restrict their goats to the specific areas that need to be worked on. They study the nutritional content of the plants they work on, so they can correctly supplement the goats' feed.

Dr. An Peischel has had extensive experience managing a variety of animals in different ecosystems—from sheep and cattle in Uruguay to elk in Hawaii. Currently she is a partner in Goats Unlimited (Rackerby, CA), a business centered around Kiko goats that works with private land owners to improve the productivity of their land. Once the goals of the land owner are established, and a vegetation analysis of the area is complete, the goats are scheduled to be brought in based on the timing of the plants they are working on. Follow up assessment is done, and further work is schedule based on that. Work on a site may need to recur for a number of years, but in that time they can successfully eradicate some species using only goats.

So whether it is goats or other animals, grazing is being used to control exotic species. Below are a few examples of how California public agencies have employed this practice.

Holistic Management in Hollister Hills State Park

Residents living near the park noticed that after the land had been taken out of grazing, there was a substantial decrease in wildflower display; and were concerned that accumulating thatch from exotic annual grasses and black mustard were increasing fire hazard in the area. With hopes to reduce the fire hazard, decrease the weed to native ratio, enhance the spread and vigor of the native perennial grasses, and improve riparian functions, David Amme, Associate State Park Resource Ecologist, initiated an experimental program to reintroduce grazing to the area. Joe Morris, a local rancher, put together a detailed biological plan to attain these goals and won the contract to implement the program.

The cattle are grazed on a 1200 acre area in the park, with stewardship as the focus. Rotating the cattle between 27 paddocks allows the land and plants to have ungrazed resting periods. For example, during the spring growing period, the cattle remain in one paddock between 2-4 days, giving each paddock approximately 30 days to rest between grazing periods. This allows for the growth and seed set of the native perennial grasses in the area, and has also served to encourage the return of wildflowers and regeneration of oaks. The vegetation has remained greener for more of the season as a result of the treatment, and thatch has been greatly reduced. So fuel reduction was also achieved. And because the cattle are rotated through the area, at any one time, the majority of the space is still available for recreation.

Joe Morris keeps cattle at Hollister Hill year round. He leases the land from State Parks, but any improvement he makes to the land (like building 27 paddocks), is deducted from the cost of the lease. He monitors the area and animals to adjust the resting period as necessary. Joe varies the number of cattle on the land by their age and size, and by the season. For example, during the dormant season of the native grasses, the amount of grazing is reduced and the rotation period is increased. The kind of management being done here is a long-term proposition, which is better for the rancher as fencing and moving cattle for a short-term project is not likely to be economically viable. The monitoring focuses both on the increase in native perennial grass cover as well as the decrease in weed cover as the measure of its success.

East Bay Regional Parks – Briones Regional Parks and Vasco Caves

East Bay Regional Parks has a contract with Goats R Us to manage a fuel break in the highly flammable Oakland Hills. The same goats then overwinter in Briones Regional Park—staying through the bud stage of yellow starthistle (*Centaurea solstitialis*) in the late spring before returning to their summer job of eating fuel breaks into the hillsides around the East Bay. The grazing done in New Briones is essentially free to that park as part of the arrangement the goat manager has with Regional Parks for maintaining fuel breaks.

The goats are grazing down yellow starthistle on 1,000 acres in the park, and have been doing so since 1997. They are moved around the area with portable electric fencing. Grazing yellow starthistle during the bud stage is important, because during that stage, grazing can prevent seed set. Goat grazing is coupled with controlled burning on 500 acres of the park. The whole area is being monitored by UC Davis for its success.

In Vasco Caves regional park, sheep are helping to maintain habitat for the endangered San Joaquin Kit Fox. No, the sheep are not part of the food chain here; they eat down weedy vegetation that tends to replace the native perennial grassland the fox lives in. Using a combination of portable electric fencing and dogs, Pete Swanson manages his sheep, to make sure they don't negatively impact riparian areas or vernal pools. The sheep are easier to control than goats; which is a part of the reason they are being used in this area that has a number of sensitive resources to consider. All 700 acres of the preserve are part of the grazing contract.

Mid-Peninsula Open Space: Russian Ridge

On 800 acres of open space on the southern peninsula of the San Francisco Bay, the regional open space district is experimenting with methods for enhancing native cover in an area where yellow starthistle dominates the vegetation in large patches. They have contracted with Rana Creek Restoration for this work. Goats and sheep were intensively grazed on a thirteen acre site two years in a row for a limited period of time. The first year they had 200 animals in one large paddock, and the soil was impacted. The next year that was altered to 5 paddocks and 70 animals to reduce that impact. The area was re-seeded with natives, which have produced a noticeable flower display. And the use of animals in the restoration project drew attention to the work, providing a good opportunity to educate visitors about weeds.

The success of this work is not only visible, but measurable as well. Cover analysis in the area showed that native cover increased 5% in the first year, 11% in the second. The per acre price for the project was high (close to \$1,000/acre), but that included having a crew who monitored the

& Weed Control

animals, did weed-whacking, and collected seeds during the period the goats were there. Getting water to the site for the animals was an issue. The intensive labor involved in this project could not be repeated at a larger scale. In other areas, fire was used, and may be expanded to handle the larger scale projects.

Point Reyes National Seashore

Controlling Cape-ivy (*Delairea*

required more careful management. The goats were left on the ¼ acre site three times, for only a couple days at each time, and then rotated off to other sites. They will return a couple more times to finish the job. Rotating the goats off to other locations has reduced the per acre cost for caprine weed control in the park. Control on the first site cost \$4,000, and the scope of the work was limited to that site only. Now Pt. Reyes has a contract that allows the goats to be rotated through a number of sites and a number of weeds including: velvetgrass, picarass, and french broom. The use of goats to control broom is exciting because the goats apparently digest the seeds, and seem to relish the seed pods. It would be more cost effective if they could increase the scale of grazing to have multi-year contracts. But even at current cost levels, the price of using goats is not out of keeping with the costs of contracted hand or mechanical removal of Cape-ivy.



odorata) is a difficult proposition. It often occurs near sensitive riparian areas and sends tendrils over desirable plants, making it difficult to spray. Mechanical removal is very tedious work, and the removed vegetation is a problem to deal with because Cape-ivy easily regenerates from fragments. At Pt. Reyes National Seashore, they have been experimenting with having goats eat it.

On a small site (1/10th of a hectare), they eliminated 95-99% of the Cape-ivy in a single treatment. About 50 goats were put on the site for 10 days in a six-week period. Oaks were tarped to prevent damage. The goats were monitored two times per day and given supplemental feed, but required no supplemental water, because the weather was cool and they were getting enough water from the eating the Cape-ivy. Not only did the goats graze off all the top growth, they also pulled up and ate the juicy stolons. Because the stolons were removed, the Cape-ivy was permanently controlled. The site has been subsequently monitored, and the few recovering plants removed.

On a second site, the steep terrain has

Considerations

Use of livestock in weed control seems to fly in the face of a body of evidence that supports a connection between the introduction and establishment of noxious weeds and grazing. Livestock can bring in weed seed on their hooves and in their fur; and they can spread weeds through their feces. They can alter an ecosystem in ways that favor exotic species including: disturbing soil crusts, causing erosion, and compacting the soil. Trampling when the soil is dry can bury seeds which increases germination of weeds like cheatgrass. Jonathan Gelbard has been reviewing scientific literature on the topic of livestock and weeds, and exhorted caution in the use of grazing for weed control because of the above-mentioned factors; and because it might be difficult to raise livestock profitably while maintaining the level of attention needed to prevent impacts. However, in the situations discussed here, the livestock manager was either paid directly or reimbursed for aspects of their management, and this may be what makes it possible.

Grazing can be a good tool for managing weeds when it is an appropriate use of the right animal at the right time. It has been used successfully to

increase native cover. Grazing can be part of a restoration project that includes other components like fire and re-seeding. In urban interface areas or along riparian corridors, it is an alternative to spraying or burning. It is a tool that requires a fair amount of planning and expertise, which is increasingly available. Hopefully there will be more documentation of experience to build on, as grazing is used more as a vegetation management tool, and as projects currently underway are evaluated in the longer term. ❖

Resources:

Dave Amme, CalTRANS, (510) 622-8709, david_amme@dot.ca.gov

Ray Budzinski, East Bay Regional Parks, (510) 635-0135, rbudzins@ebparks.org

Sarah and Hugh Buntin, Southern Oregon Goat Producers, (541) 947-2691, hbsb@CenturyTel.net
or <http://portland.bcentral.com/portland/stories/1996/10/07/tidbits.html>

Jeff Creque, Certified Rangeland Manager, 415-868-0256, jacreque@aol.com

Terri Hollman, Goats R' Us, (510) 526-3337, <http://goatsrus.com/> or info@goatsrus.com

Jodi Isaacs, Mid-Penninsula Open Space, (650) 691-1200, jisaacs@openspace.org
or <http://www.openspace.org/RRIDGE.html>

Paul Kephart, Rana Creek Restoration, (831) 659-3811, <http://www.ranacreek.com/home/index.htm>

Lani Lamming, Land Whisperer (goats), (970) 215-0733, ewe4icbenz@aol.com
or <http://www.goatapelli.com/>

Denny and Michelle McCoy, Double Buck Ranch, Wheatland CA, (530) 633-2401,
dmmd.mccoy@worldnet.att.net

Joe Morris, Cattle Rancher, (831) 623-4595

An Peischel, Goats Unlimited, (530) 679-1420, <http://home.inreach.com/kiko/> or kiki@inreach.com

John Pittos, Pittos Bros. (cattle ranchers), (530) 681-7601

Pete Swanson, sheep rancher, casheep@inreach.com

This article was contributed by: Rosie Yacoub, Research Analyst with the California Department of Food and Agriculture, ryacoub@cdfa.ca.gov

Spring 2001 Western Meetings Report

A series of conferences and meetings on noxious weeds were held in Couer d'Alene in March, 2001. Below are highlights compiled by Steve Schoenig of the California Department of Food and Agriculture.



Joe 'Vino' DiTomaso in tocalote regalia during the "guess that knapweed" revue

A Summary of Meeting Highlights

Western Weed Coordinating Committee Annual Meeting (March 12):

- ◆ Much of the program focused this year on national level initiatives.
- ◆ National Invasive Species Week was held in Washington DC to raise the level of awareness of policy makers. Most State Weed Coordinators attended and held informational meetings with their state's congressional staff.
- ◆ Senate Bill 198 is a federal equivalent of the California State Senate Bill 1740 which would direct monies through the state departments of agriculture, for Weed Management Area support (*see article on page 3*).
- ◆ The National Invasive Species Council (created by Clinton's Executive Order 13112) was discussed at length in light of the change in administration. There was much interest in Ann Veneman and many felt she will play a key role in charting the course for this council.

Western Society of Weed Science Annual Meeting (March 13-16):

- ◆ Discussion of the National Invasive Species Council.
- ◆ A talk on the use of statistical sampling methods to estimate the cover of noxious weeds over a large landscape.
- ◆ A talk on the use of remote sensing to survey weeds using satellite images.
- ◆ A talk on the use of Computer Keys for identification of plants (much easier and more powerful than dichotomous keys).

International Knapweed Symposium (Mar 15-16):

- ◆ Contacts established with projects leaders for a spotted knapweed eradication project on the Salmon River in Siskiyou County.
- ◆ Information gathered on treatment methods for both the management and control of spotted, squarrose and diffuse knapweeds – all A-Rated weeds in California.
- ◆ Heard a talk by a research group developing a way to engineer and propagate sterile yellow starthistle plants, the pollen of which renders naturalized starthistle also infertile. This could theoretically be used analogously to insect sterile release programs.
- ◆ Dr. Joe DiTomaso gave an overview of starthistle management with the latest assessment of Transline herbicide. ♦

EQIP...continued from page 1

small-group discussions will be targeted to the livestock, **weed management**, vine, tree and row crop industries. An informal poster and exhibit session will also take place at noon featuring EQIP-funded projects and outreach materials.

EQIP is a voluntary conservation program which encourages and supports farmers and ranchers to make cost-effective and technically sound natural resource management decisions. Since 1997, the EQIP Education Program has provided over two-hundred grants to address resource concerns which have been identified by local work groups to conserve and improve soil, water, air and related natural resources. Established through the 1996 Farm Bill, EQIP funding comes from USDA's Commodity Credit Corporation.

To register for the EQIP Education Conference, call (916) 447-7237 or download the materials from the CARCD web site at www.carcd.org. Pre-registration in advance of May 19 is \$20. Lunch and materials will be included. Early registration is recommended. ♦

Federal Bill...continued from page 3

- no more than 5% may be used by the state or federal government to pay administrative costs of the program
- funding may not be allotted to carry out projects to control or eradicate aquatic noxious weeds or animal pests

To be an eligible weed management entity, an organization must be established by local stakeholders to control or eradicate harmful, nonnative weeds on public or private lands and/or educate the public about harmful nonnative weeds. The organization must also provide a description of its purposes and any projects that it carries out during the first fiscal year of funding. Qualifying projects are those that include education, inventories and mapping, management, monitoring and similar activities, as well as innovative projects with results that are disseminated to the public.

A state shall select projects for funding on a competitive basis depending on the seriousness of the weed problem, the likelihood that the project will prevent or resolve the problem, the extent to which the funding will leverage non-federal funding, the progress the weed management entity has made to address weed problems, how comprehensive of an approach to control and eradication of weeds the project is, and the extent to which the project will reduce the total population of harmful nonnative weeds within the state.

The bill was referred to the Senate Committee on Energy and Natural Resources and is still pending legislation. ♦

WMA Update

There has been a lot of activity with the State's weed management areas over the past three months. With new money available to weed management areas through the signing of Senate Bill 1740, groups have quickly developed Integrated Weed Management Plans to submit to CDFA to obtain funding for conducting work this field season. Contracts are currently being established with approximately 31 different WMAs. In year 1 of funding from AB1168 (2000), seven of these groups conducted weed management projects. They were: El Dorado Weed Management Area, Eastern Sierra Weed Management Area (Inyo-Mono), Kern Mountain Desert Weed Management Area, Lassen Special Weed Action Team, Marin Weed Management Area, Plumas-Sierra Weed Management Area, and Central Sierra Partnership Against Weeds (Tuolumne/Calaveras). Sixteen additional groups will be conducting weed management projects this field season (2001) also with funds through this earlier legislation. Most of these groups have also applied to get funding from the newer legislation (Senate Bill 1740) and will conduct control, survey, and education projects this field season in addition to projects already proposed. Thus we anticipate this field season to accomplish a lot in the way of weed control all over the state of California.

In addition to mobilizing control efforts, mapping projects, and education, these groups will be required to demonstrate progress in their group evolution with the submission of completed MOUs and formal strategic plans. Proposed projects range from cost-share programs with private land owners, providing supplies for private land owners to conduct weed management projects, roadside weed management, controlled burns, weed pull days, introducing biological control agents, conducting and collecting survey (mapping) work, and educational workshops, demonstration plots and display materials. Plant species listed for management include many A-rated species including purple starthistle, Dalmatian toadflax, Scotch thistle and several B- and C -rated species, for example yellow starthistle, tall whitetop (perennial pepperweed), arundo, jubata grass, brooms, and medusa head, to name a few.

CDFA will be hiring additional staff to work solely on coordinating weed management areas projects. The dual goals of trying to secure a permanent funding source for WMAs and rallying people around the state to participate in the groups looks very promising. All but 5 counties in California are currently participating in weed management areas. We are on our way to demonstrating the great success of local collaborative weed control to the public and the legislature. This is a long process that will require the next three years to document our efforts in conducting this pilot program. The only way that we will succeed is by working together. Mark your calendars for the 3rd Annual Statewide Weed Management Meeting in early October, 2001. ❖

NOXIOUS WEED MANAGEMENT AREA SUPPORT PROGRAM MISSION STATEMENT

To demonstrate the power of local, cooperative action in protecting our natural and agricultural resources by:

1. Eradicating and managing noxious and invasive weeds in an integrated, strategic and prioritized fashion;
2. Stopping the spread of noxious and invasive weeds on public and private lands;
3. Educating people at all levels about the need and opportunities to manage weeds.

Call For Noxious and Invasive Weed Research Proposals, *May 22nd Deadline*

The California Department of Food and Agriculture (CDFA) is now requesting research proposals from qualified research entities to perform research on the biology, ecology, or management of noxious and invasive weeds. CDFA is soliciting grant requests from qualified public and private research entities in accordance with Senate Bill 1740. Proposed research projects must be needs-based, applied and practical. Proposals must be received at the CDFA Contracts Office no later than 3:00PM on **May 22, 2001** (postmarked proposals will not be accepted).

Four research priority areas were selected from responses to a survey conducted with the California Interagency Noxious Weed Coordinating Committee and priorities highlighted in a Weed Science Society of America Research Report entitled, "Future Research Directions for Weed Science." Research priority areas include:

- (1) Impacts: Economic Analysis/Assessment and Ecological Impacts,
- (2) Integrated Weed Management: Refined Tools and Technology,
- (3) Restoration and Revegetation, and
- (4) Other/ General category.

To receive a copy of the general specifications and proposal format and content requirements (officially referred to as the: Notice of Funds Available for Research Grant Projects, NOFA #01-0005) contact Jan Howard, CDFA Contract Analyst via email, jhoward@cdfa.ca.gov or fax, (916) 654-0395. Further, all questions and requests regarding the NOFA must be made in writing to Jan Howard by April 20th, 2001. Written requests should identify the NOFA number, name of entity, contact name, mailing address, phone number and fax number. ❖

Ecological Restoration:

BY: Jennifer Drewitz

Restoration and Revegetation are important, but often overlooked, components of Integrated Weed Management. Jenny Drewitz, in the following article, focuses on the topic of restoring ecological land values. In a following issue we will focus on the restoration of forage value in grazing systems following weed control - a similar set of activities with different desired outcomes. It is hoped that restoration of sites will "protect" them from re-invasion of weeds, however it seems that this concept, as a general rule, is scientifically untested and may not work with truly invasive exotics. -Editor

What is restoration?

According to the Society of Ecological Restoration (see box on page 12), restoration is the process of assisting the recovery and management of ecological integrity. Ecological integrity includes a range of variability in biodiversity, ecological processes and structures, regional and historical context, and sustainable cultural practices (SER Board of Directors, 1996).

Restoration has evolved in many ways. It was born from the revegetation/horticultural industry. In the earlier years, restoration tended to involve planting invasive species that grew quickly without much regard to weediness. Thus, many problematic invasive plant species were planted in early revegetation efforts. Since then, utilization of native plant species in restoration (see box on opposite page) has revealed many benefits, such as increased success of

propagation due to native plants' special site adaptations, increased wildlife habitat, and decreased invasive weed spread.

From the late 1970s through the 1980s the revegetation trend began to change with the development of the Society for Ecological Restoration. It became apparent that representatives from several different disciplines were involved in restoration projects. Initial efforts in restoration were focused on priority species that were threatened or endangered and around wetland/riparian areas, in stream habitat, and vernal pools. This early "single species approach" has since evolved into a more holistic, systems approach, focused on entire ecological systems. As a result, restoration has expanded beyond just wetland habitats. The systems approach uses multidisciplinary teams that are made up of economists, hydrologists, and biologists. An emphasis is placed on working with landowners who own property within watersheds. It has been found that involving private landowners is critical to the success of a watershed scale project.

Those involved in restoration today are typically from three interest groups: technicians, private landowners, and academics. Resource Conservation Districts (RCDs) and environmental consulting firms, like Circuit Rider Productions, Inc. have been conducting environmental restoration for decades. Methods developed for restoration were born from groups like these through hands-on experience. Over the years, as the

concept of restoring entire systems (watersheds in particular) developed, private landowners became more involved. As restoration became more important in resource management, academics entered the field. The academic sector brings yet another body of knowledge, including research on the interactions of various components of the system, as well as components

What is the difference between restoration, revegetation, and reclamation?

Restoration repairs damage caused by humans to native plant community diversity. **Revegetation** establishes plants, either native or non-invasive, in areas devoid of vegetation. **Reclamation** makes a disturbed site habitable to plants that were originally present, or to plants that approximate the original.

that aid or hinder the success of restoration efforts (e.g. native plant propagation and weedy plant invasions). Scientists are also developing ways in which to measure the degree of success that have resulted from the implementation of these practices.

Restoration in the Dunes

Less than 3% of the California landscape is composed of coastal dunes. California's unique

California Ecological Restoration Projects Inventory <http://ice.ucdavis.edu/CERPI/>

The California Ecological Restoration Projects Inventory is a combined private/non-profit/government effort to establish a database, accessible through the Internet, containing information on restoration projects in California. The database aims to further the practice and science of restoration and assist agencies and practitioners during restoration planning and implementation. Reference information includes: implementation information such as the type of ecosystem restored, plant species used, soil and nutrient amendments, erosion control measures, as well as, monitoring information including project goals, performance standards, and monitoring data. CERPI is funded under an Environmental Technology Initiative Grant provided by the U.S. Environmental Protection Agency, and through matching funds provided by the California Department of Conservation, and SERCAL. The database is intended for use by agencies, academics, consultants, project designers and implementers.

Where Are We?

dune system falls victim to high human impact as a result of industry, tourism, recreation, settlement, and a continual effort to stabilize this inherently unstable system. A new book by A. Pickart and J.O. Sawyer (1998), "Ecology and Restoration of Northern California Dunes," addresses both the complex dune system and factors affecting restoration along the Northern California Coast. Dune restoration centers around exotic species removal on semi-stable, open dunes. If in an area with remnant native plants, restoration using manual control methods (as opposed to chemical or heavy equipment) has been found to allow for regeneration of native plant species. Alternatively, the use of heavy mechanical or widespread chemical control methods often disturb remnant native populations, triggering the need for revegetation (bringing in and planting of vegetation back into the system).

Two common invasive exotic species of concern in dune systems include yellow bush lupine (*Lupinus arboreus*) and European beachgrass (*Ammophila arenaria*). In the early days, because dunes were erroneously considered unstable, yellow bush lupine was planted to help "stabilize the sand." Yellow bush lupine fixes nitrogen, leading to an alteration of soil nutrients. Such a change creates a soil environment that is hospitable to weed species, particularly annual grasses. Secondary invasions further degrade the dune system, requiring a restorative effort beyond just simply removing exotic plant species. There must be a continuous removal of the duff layer created by the secondary species and subsequent removal of weeds over an extended period of time. Hand-pulling, weed-eating, burning, and duff removal are all techniques used on dune sites to remove annual grasses. Techniques have varying degrees of effectiveness in reducing annual grasses. Controlled burns have been

used to both remove duff layers and control invasive species.

Mechanical removal of European beachgrass with heavy equipment on the dunes is a relatively new technique for restoration of dune habitat. It is not uncommon for restorationists to attempt to speed up succession by planting more "climax" species like shrubs and trees. This new approach utilizes mechanical removal and heavy equipment, to effectively set succession back. By utilizing the appropriate tool, huge trenches are dug, undesirable European beachgrass is buried, and the area is capped with new sand. The result is a viable and economical method of European beachgrass removal that is subsequently planted with native dune grasses.

Another new topic in dune restoration is the role of cryptogamic crusts or microbiotic crusts in coastal dune systems and how they are affected by invasive weed species. Cryptogamic crusts are mats composed of non-vascular plants or plant-like organisms including lichens, mosses, liverworts, algae, fungi, and cyanobacteria. These crusts are known to be an important part of desert systems and evidence has been found indicating that they may be instrumental in primary and secondary succession. There is evidence to suggest that in areas where European beachgrass and yellow bush lupine occur in high densities, "cryptogam diversity is greatly reduced" (Pickart, email on March 15, 2001).

Article continued on next page...

What is a Native?

By: Truman P. Young, *Assistant Professor and Restoration Ecologist,
Dept. of Environmental Horticulture, UC Davis*

An essential element of restoration projects is the encouragement of native species. This is not merely because natives do better, but because the goal of most restoration projects is to return the site to as natural a condition as possible. So what is a native plant? The answer may seem simple, but it has temporal, geographical, and taxonomic/genetic elements.

Time: Although Native Americans moved plants around both intentionally and otherwise, most restoration ecologists (in the Western Hemisphere at least!) are satisfied with setting a time limit of 1500. Types that were here before Columbus are "native". That is as far as most definitions go, but we still need to clarify "here" and "types", and assume that we can reliably determine the status of plants 500 years ago (no simple task in some highly disturbed California landscapes).

Geography: In horticulture, the limits of native species are often state lines, but restoration requires a much more restrictive meaning. Plants should be taken from as near the restoration site as possible, usually within a few miles. Geographic definitions merge with taxonomic ones.

Taxonomy: Gone are the days when suppliers can say, "Well, the genus is native." However, we still see cases of Saskatchewan grasses being peddled in San Diego. At the very least, plants used in restoration should be of the lowest known taxonomic level (this is often not merely species, but subspecies or variety). Even finer genetic matching is preferable. The U.S. Forest Service divides California into dozens of "seed zones" and tries not to move material between them. In Yosemite, restorationists try to bring material from the same local catchment. The ideal is to harvest seed or plant material at the site itself, either prior to disturbance, or among the survivors.

Genetic pollution has the potential to be as damaging as noxious weeds to the natural heritage of California, and it would be a shame if the restorationists are part of the problem instead of part of the solution. The theme underlying all of this: "Is it likely that this genotype would have gotten here without human activity?"

Restoration in Riparian Habitats

It is estimated that 95% of California's historical riparian forests have been lost, as a result of logging, urban development, water diversion, gravel mining, and agriculture. Major considerations in riparian restoration include: stream movement, wildlife habitat, riparian corridors, and exotic invasive plants. Surprisingly, invasive weeds are a relatively new and increasingly important factor in riparian restoration. It has only been in the last ten years or so that species like *Arundo* have really begun to hinder the implementation of restoration projects. Due to both a continued escalation in habitat alteration and an increased general awareness about the threat of invasive species, invasives have become a large consideration in restoration efforts.

Species like giant reed (*Arundo donax*), tamarisk (*Tamarix spp.*), and ivy (English and Cape ivy) are important exotic invasive species often targeted for control. These invaders exclude native vegetation, use large amounts of water, increase fire danger, and do not support the same diversity of wildlife that native plants do. New trends in riparian restoration include: selective trimming of particular species instead of large-scale vegetation removal in riparian areas, coordinating with landowners in watershed scale

restoration projects, and focusing on invasive species removal as opposed to just the planting of native species. Another idea resurfacing in California restoration (widely used in Europe), is the use of biotechnical techniques in erosion control. Such techniques include hard structures used for soil stabilization like rip-rap and gabions. These structures prevent natural water movement. Drawbacks might include: cost, obtaining permits, damage to neighboring properties, and laborious maintenance. A new spin on this old technique is the use of natural biological structures such as stabilizing plant species or a mixture of rip-rap and plants.

Grassland Restoration

Native plants in grassland communities have a number of benefits. Native perennial grasses are easily managed by occasional mowing or burning and are drought tolerant. Native grasses also provide excellent habitat for wildlife. Weed control is one of the primary concerns for restoration of native plant species in grasslands. The propagation of native grasses is often impacted by competition with annual invasive grasses. Beyond weed control, factors involved in grassland restoration include: choice of plant species, site preparation, and timing of planting/seeding.

Many techniques are available for weed

control in grasslands. New, integrated management techniques are continually being refined and developed for the management of undesirable grassland species, including tips for the first three years after planting.

Pre-emergent herbicides may be instrumental in seedling establishment of desirable grass species. The California Native Grass Association's newsletter *Grasslands* (Fall 2000), reports a study which supports the idea that the use of chlorsulfuron (Telar) as a pre-emergent when native-seed is sown may reduce the cover of select non-native annual species and help promote the growth of native seed in the first growing season. Telar appears to be able to release native seedlings from competition with annual grasses and result in an increased growth when compared to non-treated sites. This report is just one example of incorporating herbicides into an integrated grassland restoration effort.

The *Noxious Times* has reported on the affect of grazing and controlled burns in grasslands (This issue: articles on pages 4 and 6; Last issue: Vol. 3, No. 3, article on pg 4). The use of grazing in grassland restoration can have both beneficial and detrimental impacts. Important factors

The Society for Ecological Restoration <http://www.ser.org/>

The Society for Ecological Restoration (SER) is an international non-profit organization infused with the energy of 2,300 members - individuals and organizations who are actively engaged in ecologically-sensitive repair and management of ecosystems through an unusually broad array of experience, knowledge sets, and cultural perspectives.

While the Society does not itself engage in restoration projects, its mission is to serve the growing field of Ecological Restoration through facilitating dialogue among restorationists, encouraging research, promoting awareness of and public support for restoration and restorative management, contributing to public policy discussions and recognizing those who have made outstanding contributions to the field of restoration. SER promotes ecological restoration around the globe through a newsletter, website, training program, committees, working groups, two journals and annual conferences. Founded in 1988, the Society now serves members in 31 nations with 13 chapters serving regions of North America, England, Australia and India.

SER puts out two journals:

1. *Restoration Ecology* is owned by SER and published by Blackwell Science. It began publication in 1993 and is issued quarterly. It is a peer-reviewed scientific and technical journal that publishes scholarly manuscripts covering the academic field of restoration ecology. The 30-member Editorial Board includes eminent scholars from around the world.

2. *Ecological Restoration* is owned by the University of Wisconsin Arboretum and edited by personnel of the Arboretum who are also members of SER. It is made available to SER members by special arrangement with the Arboretum. It is published quarterly and covers a broad range of topics, including progress reports on current restoration projects, topical and regional reviews of restoration activities, philosophical discourses on environmental ethics, descriptions of new restoration techniques, reviews of conferences and books, op-ed pieces, and letters from readers. A few of the more technical articles are peer-reviewed. Otherwise, manuscripts are meticulously reviewed by Ecological Restoration's editor and founder, William R. Jordan III, for a crisp and literate journalistic style.

include the frequency of grazing, stocking rates, and choice of animals (cattle, sheep, or goats). Holistic resource management, which promotes short-duration grazing can facilitate livestock management and control, but conservative stocking has been shown to be more effective for enhancing native plants and improving range condition (McClanahan, *Grasslands* fall 2000, Holistic Resource Management unproven in California rangeland).

For more information addressing restoration in grasslands, please refer to: Ducks Unlimited publication, *Valley Habitats, Number 14*; the California Native Grass Association's newsletter, *Grasslands*; and the Yolo County Resource Conservation District's, *Know Your Natives* Guide.

New topics in the field of grassland restoration include the influence of fertilizer, mulches, and herbicides on the success of revegetation. Fertilizer may increase weed growth, which may increase competition with desirable plant species. Around perennial grass plantings, several mulches are used to suppress weed growth. Considerations in

using mulches include: potential for weed seed introduction, decomposition rates, and potential allelopathic effects. To date, the best mulch seems to be rice straw. In the past, wheat and barley straw were used. The results of a study reported in *Grasslands Vol X, No. 1 winter 2000* by Cynthia S. Brown et. al resulted in the following observation, "perennial grass performance was best with rice straw, was improved by the addition of nitrogen fertilizer in the presence of weeds and was not greatly affected by the addition of compost." Composition of seed mixtures and seeding rates are two factors that should be considered. Faster growing annual grass species, often used to more quickly "stabilize" the soil, slow and often prevent the successful establishment of perennial grasses. Contamination of seed mixtures with undesirable weed species should also be considered. Testing a sample of your grass mixture in a controlled setting (e.g. greenhouse) before broadcast seeding at your restoration site is often recommended to prevent accidental introductions. ❖

Related Websites:

Watersheds: [http:// www.watershedrestoration. com/](http://www.watershedrestoration.com/)
River Corridor and wetland restoration: [http://](http://www.epa.gov/owow/wetlands/restore/)

www.epa.gov/owow/wetlands/restore/
California Native Plant Society: [http:// www.cnps.org/activities/aboutCNPS.htm](http://www.cnps.org/activities/aboutCNPS.htm)
SERCAL is the California Chapter of the Society for Ecological Restoration (SER), [http:// www.sercal.org/](http://www.sercal.org/)
SERCAL newsletter http://www.sercal.org/ecesis_newsletter.htm
Yellow starthistle management web site: [http:// wric.ucdavis.edu/yst/index.html](http://wric.ucdavis.edu/yst/index.html)
California Native Grass Association: [http:// www.cnga.org/](http://www.cnga.org/)

References:

Grasslands. A Newsletter put out by the California Native Grass Association.
Valley Habitats. A technical Guidance Series for Private Land Mangers in California's Central Valley. A Ducks Unlimited newsletter.
A Guide to Restoring Native Riparian Habitat in the Russian River Watershed by Sonoma County Water Agency and Circuit Rider Production, Inc. 1998 Circuit Rider production, Inc.
Pickart, A. and J.O. Sawyer (1998), "Ecology and Restoration of Northern California."

An Example of Applied Grassland Restoration Methodology

The following information is based on observations from Craig Dremann at The Reveg Edge. He has pioneered competitive restoration methods that are aimed at providing permanent exclusion of undesirable species such as yellow starthistle from grasslands. He would like agencies to test his methods by licensing this technology around the state. CDFA and CINWCC can not endorse this technology, nor can they attest to its efficacy. We provide this description as an example of an applied grassland restoration methodology that uses prescriptive plant composition management. -Editor

A quarter century of studies and trials of yellow starthistle control (1975-2000) has been conducted by universities, public land managers, and volunteers. The principle methods employed are burning, pulling, release of insects, grazing, herbiciding, and mowing. Over the last fifteen years of test plot work, The Reveg Edge reports to have developed two yellow starthistle control techniques that shorten the time needed to control the plants, the Temporary Method and the Permanent Method. The Temporary Method is touted to work within 60 days or less, and control yellow starthistle close to 100% for many years. Dremann states that, "the Permanent Method's success is reported to rest on the "ecological concept" that starthistle is only one member of the whole introduced European exotic biome that has been spread over the State of California. That yellow starthistle is one of the only "non-useful" members of those exotic species— wild oats, ripgut grass, "Blando" brome, "Zorro" fescue, "Panoche Red" brome that are seen as "acceptable exotics" because they are useful for hay and animal fodder." Dremann further believes, "ecologically, all exotics work together to destroy and displace California's original ecosystem." The Permanent Method is used to replace yellow starthistle, with the original local California ecosystem species. According to Dremann, "Just like a good paint job on your car, it is more expensive in materials and effort to reintroduce a local ecosystem that can function on its own." The Temporary Method, however, is only a way to have quick results, touted to wipe out the exotic problem within 60 days or less, but there is a chance that starthistle can return if a functioning local ecosystem is not put back in its place. Both processes or techniques do not use any herbicides, mowing, burning, pulling, release of insects, or grazing—instead they rely on the local ecosystem's ability to, as Dremann puts it, "heal itself."

Reveg Edge methods and processes are available for licensing to public land managers on a per acre rate of \$25 per acre for the Temporary Method, and \$100 per acre for the Permanent Method. Materials, labor to apply the methods, and any additional consulting, is extra. Dremann is boldly confident that, "once their methods and processes begin to be employed, that within a relatively short amount of time, starthistle will be only a historic footnote of a former weed problem in California." ❖

For more information check out The Reveg Edge website, <http://www.ecoseeds.com/starthistle2.html>

International...continued from page 1

The United States has both a need and a responsibility to approach the invasive species problem from an international perspective:

1. The U.S. will not be able to succeed in addressing its domestic invasive species problems, unless it takes a leadership role in international cooperation and invests in strategies that raise the capacity of other nations to manage invasive species. Our ability to prevent invasive species from entering the U.S. depends greatly upon the capability of other countries to effectively manage invasive species and invasion pathways domestically. Once invasive species become established within one country, they pose a threat to an entire region, as well as to trading partners and every country along a trading pathway. However, if an invasive species never leaves another country, it will never become a problem in the U.S.
2. Actions by the U.S. have sometimes contributed to the invasive species problems faced by other countries. Despite good intentions, we have inadvertently facilitated the introduction of invasive species to other countries through development assistance programs, military operations, famine relief projects, and international financing. In meeting demands for U.S. products, we have exported organisms that are invasive here and have the potential to be invasive elsewhere. While traveling the world, U.S. tourists may accidentally relocate organisms in their luggage, on their bodies, and through their means of transport.

The U.S. faces several challenges in preventing and controlling the spread of invasive species globally:

- Only a few other countries (e.g., Australia, New Zealand, and South Africa) have invested in the development of well-coordinated policies and programs to address the problem;
- Developing countries that recognize the gravity of the situation and want to take immediate action are hampered by a lack of scientific, technological, and financial resources;
- Efforts of most governments to address invasive species problems are poorly coordinated; and
- Neighboring countries are often unaware of each other's policies and practices.

Clearly, the U.S. needs to promote international consistency and adequate standards in policies to prevent and control the spread of invasive species. Governments and international organizations are already using conventions, treaties, and other forms of international agreements to raise awareness of the invasive species issue and take coordinated steps to establish prevention and control policies. These range from trade-related agreements that play a significant role in the regulation of invasion pathways to agreements focused on the protection of specific ecosystems or endangered species. Governments and international organizations need to work together to strengthen and expand existing authorities and identify areas in which new authorities are needed. The U.S. also needs to encourage industry and other sectors to adopt codes of conduct, thus setting voluntary standards to help limit the spread of invasive species.

By openly sharing information and technologies and establishing cooperative research programs with other countries, the U.S. can raise awareness of the causes and consequences of invasive species, increase the capacity of governments to prevent and control invasive species, and lower the costs of invasive species management here and abroad. For many years, various agencies of the U.S. government have assisted countries with scientific information on the invasive species that threaten their economies and human health. We have also provided technologies, such as biological control agents, that have helped countries eradicate or control invasive species. These efforts support the U.S.'s broader development assistance objectives of securing food, water, and human health through economic growth and environmental protection.

Key Players

The National Invasive Species Council (NISC) released its first invasive species management plan ("Meeting the Invasive Species Challenge") in January 2001. The Plan includes more than 20 actions that the U.S. government will take over the next two years to address invasive species issues internationally. A copy of the Plan, as well as a list of international agreements and codes of conduct on invasive species, can be found at the Council's website: <http://www.invasivespecies.gov>.

The Global Invasive Species Programme (GISP) is a cooperative program founded by the Scientific Committee on Problems of the Environment (SCOPE), World Conservation Union (IUCN), and CAB International (CABI). Between 1996 – 2000, the program focused on raising awareness of the invasive species issues globally, synthesizing information from a variety of disciplines, and identifying tools to address the problem. The major conclusions and recommendations from this work are available in a series of publications (see column to the right). GISP's is now joining with governments and other international organizations to implement its most important recommendations. For details on GISP's programs, see <http://www.jasper.stanford.edu/GISP>. ♦

Resources

- McNeely, J.A., H.A. Mooney, L.E. Neville, P. Schei, J.K. Waage. (eds.) 2001. *A Global Strategy on Invasive Alien Species*. CAB International, Wallingford, Oxon, UK.
- McNeely, J.A. (ed.). 2001. *The Great Reshuffling: Human Dimensions of Alien Invasive Species*. IUCN, Gland, Switzerland.
- Mooney, H.A. and R. J. Hobbs (eds.). 2000. *Invasive Species in a Changing World*. Island Press, Washington, D.C., U.S.A.
- Perrings, C., M. Williamson, and S. Dalmazzone (eds.). 2000. *The Economics of Biological Invasions*. Edward Elgar Publishing, Northampton, MA, U.S.A.
- Shine, C., N. Williams, and L. Gundling. 2000. *A Guide to Designing Legal and Institutional Frameworks on Alien Invasive Species*. Environmental Policy and Law Paper No. 40. IUCN- The World Conservation Union, IUCN – Environmental Law Centre, Bonn, Germany.
- Wittenberg, R.; Cock, M.J.W. 2001. *Invasive alien species: A Toolkit of Best Prevention and Management Practices*. CAB International, Wallingford, Oxon, UK. Global Invasive Species Programme. 2001.

For further information, contact Jamie K. Reaser, at 202-208-2834 or email her at jamie_reaser@doi.gov.

California Department of Food and Agriculture

District Biologist Profile: Ed Finley

Ed Finley was born and did most of his growing up in the Bay Area. Finley lived near the cliffs overlooking the ocean where he and his friends would climb down to the beach on a regular basis. There were still natural areas with plenty of wildlife. Wall-to-wall houses hadn't yet covered the Peninsula. He remembers catching San Francisco garter snakes (now an endangered species) and wouldn't doubt if we caught some red-legged frogs too. Summers usually included camping trips, which got his family out of the fog and into the wilds of Northern California. Finley's favorite spot was Lassen Volcanic National Park, but anywhere with water was alright with him.

After graduation, from Westmoor High School in Daly City, Finley completed lower education requirements at the College of San Mateo before transferring as a junior to Humboldt State University. Later Finley enrolled at San Francisco State University where he completed his B.S. degree with a concentration in Ecology and Systematic Biology, but not before getting married, moving back to San Francisco, and having his first daughter. Finley continued working on his education (Master's degree), while juggling child rearing responsibilities (a second daughter was born) and holding down odd-jobs to make ends meet.

Finley Finds his Way to CDFA

One day in the summer of 1978, a crew from the CDFA Dutch Elm Disease Project knocked at Finley's door. They explained that they were surveying the neighborhood for elm trees and checking for symptoms of Dutch elm disease. Finley asked how one gets such a job. They gave him the address for the office; he applied, and was hired the next week as an Agricultural Aide. For the next few years, Finley worked seasonally for CDFA, as well as the Department of Fish and Game (Herring and Pacific Salmon Projects) and the Department of Forestry (Dutch Elm disease project). It was in 1985 that Finley landed his first permanent full time job with CDFA as an Agricultural Pest Control Specialist for the Pest Detection/Emergency Projects Branch (PD/EP) field office in

Campbell. For the first few years of his career at CDFA, Ed was involved mostly with eradication projects, which included Japanese beetle, gypsy moth, white-fringed beetle, oriental fruit fly, apple maggot, and of course medfly. Finley gained valuable weed and vertebrate experience working with detection biologists, particularly surveying for hydrilla. Finley also had the good fortune to gain vertebrate pest control knowledge working with Control and Eradication Branch (C & E) biologists on rodenticide trials in Modoc County. Finley became the detection biologist for the Bay Area/Delta District until biologists from PD/EP and C&E were merged under the new Integrated Pest Control Branch (IPC) in 1992. Finley has since worked as the San Jose District biologist covering nine Bay Area counties.



Ed Finley surveys a puna grass infestation

When Finley was first hired as a seasonal hydrilla had only recently been detected in California and there were a couple of eradication projects. Hydrilla and other aquatic weeds continue to be a threat to California agriculture (mainly in irrigation systems), as well as the environment. During the early 1980s, with the massive medfly eradication project in the Bay Area, there was less emphasis placed on noxious weeds.

Many of the CDFA personnel were assigned to "bug" projects. Finley noted that this shift was detrimental to progress attained on A-rated weed projects. Finley hopes that the current heightened public awareness about invasive species will allow CDFA biologists to continue their work against noxious weeds, uninterrupted. Finley predicts that in the future there will be less differentiation between agricultural weeds and environmental weeds and that the scope of the biologist's job will continue to focus on threats to agriculture, but will expand through partnerships with other agencies and organizations, such as recently formed Weed Management Areas.

Changes in Pest Management

Throughout Finley's career, the biggest change in pest management is the move towards integrated pest management (IPM). In the past, often only one successful control technique, commonly a pesticide, was relied upon until it failed. Now, a combination of a variety of techniques may help suppress pest populations to a point where pesticides are merely necessary tools and their use may be significantly reduced. Finley added, "restoration is an area in need of research. We need to find out what we can use to replace weeds once they've been successfully eradicated."

Advice for Future Weed Managers

Finley's advice to those interested in Weed Management is to learn what techniques are successful, then use them, but don't neglect to keep an open mind for improvement. Talk to colleagues, learn from them, and share what you've learned with others.

Key to Weed Management

When asked what are the key to weed management, Finley replied, "It can't be said often enough, persistence is probably the key factor in managing weeds. You have to wear them out by returning over and over, consistently applying control measures that get the weeds before they set seed or spread vegetatively." ♦

Upcoming Events and Recent Publications

New Comprehensive Yellow Starthistle Website!

From Biology and Management to developing a strategic plan, current legislation, and a list of references. Visit:

<http://wric.ucdavis.edu/yet/index.html>

CDFA CALL for Research Proposals, Deadline May 22
Qualified research on management of noxious weeds and invasive species is now requested by CDFA. Details on page 9.

New Invasive Species Grant Program

There is a new \$1.25 million fund from the federal government for research on any invasive species (insects and plants) which impact California. The funds will be managed by University of California, Center for Exotic pests, located in Riverside, CA. For more information, joseph.morse@ucr.edu

Handbook for Land Managers

The Colorado Natural Areas Program has recently published Volume IV in their Caring for the Land Series: "Creating an Integrated Weed Management Plan: A Handbook for Owners and Managers of Lands with Natural Values."

Download the free handbook at their website:

http://cnap.state.co.us/IWN_handbook/IWM_index.htm

EQIP Education Conference, June 7th, 2001

Statewide conference to exchange conservation information and promote partnerships. Details on page 1.

Weed Control Methods Handbook ONLINE!

The Nature Conservancy is pleased to announce this NEW online handbook. Consisting of 7 chapters and 6 appendices, it reviews manual, grazing, fire, biocontrol, and herbicide techniques. Plus a great deal of supporting information on herbicide use. <http://tncweeds.ucdavis.edu>

Weed Biocontrol

Extended Abstracts from the 1997 Interagency Noxious Weed Symposium. This is a 58 page publication that covers aspects of weed biological control related to the history of biological control, regulation, safety, implementation, and monitoring. For inquiries email Van Driesche at vandries@nfr.umass.edu and Richard Reardon, USDA Forest Service, rreardon@fs.fed.us

Invasive Species in a Changing World

This latest book on the subject of biodiversity-in-peril is comprised of 17 chapters by different authors, the chapters defining the dimensions of the problem, societal impact (health and economics) and describing regional examples in S. Africa, Germany, New Zealand, and Chile. For orders call (800) 828-1302 or visit: <http://www.islandpress.org>

Florida Aquatic Weed Short Course, May 14-18, 2001

Aquatic weed control, upland and invasive weed control, aquatic plant culture and revegetation.

For more information, visit: <http://ifas.ufl.edu/~conferweb/aw>

View the latest newsletter at the *Noxious Times* website, BEFORE it arrives in your mailbox! www.cdfa.ca.gov/noxioustimes



CALIFORNIA INTERAGENCY NOXIOUS WEED
COORDINATING COMMITTEE
NOXIOUS TIMES

1220 N STREET, ROOM A-357
SACRAMENTO, CA 95814
return services
requested

PRE-SORTED
STANDARD
U.S. POSTAGE
PAID
PERMIT NO. 2550
SACRAMENTO, CA